

like growth factor; (5) at least one chondroinductive agent or factor; and (6) glucose. ^{any}

43. The process of Claim 42 wherein said mesenchymal stem cells are isolated, culture expanded human mesenchymal stem cells.

44. The process of Claim 42 wherein the mesenchymal stem cells are condensed into close proximity.

45. The process of Claim 44 wherein the mesenchymal stem cells are present as packed cells or a centrifugal cell pellet.

46. The process of Claim 42 wherein said at least one chondroinductive agent or factor is selected from the group consisting of (i) a glucocorticoid; (ii) a member of the transforming growth factor- β super-family; (iii) a component of the collagenous extracellular matrix; and (iv) a vitamin A analog.

47. The process of Claim 42 wherein said at least one chondroinductive agent is a combination of dexamethasone and TGF- β 1.

48. The method of Claim 42, and further comprising placing said cells in a rigid porous vessel.

49. The method of Claim 48 wherein said rigid porous vessel is a ceramic cube.

50. The process of Claim 42 wherein said glucose is present in said serum-free medium in an amount of from about 3 grams per liter to about 7 grams per liter.

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51. A process for inducing chondrogenesis in mesenchymal stem cells by culturing mesenchymal stem cells in a chemically defined serum-free medium *in vitro* wherein the mesenchymal stem cells are associated in a three-dimensional format, and wherein said chemically defined serum-free medium comprises (1) a chemically defined minimum essential medium; (2) ascorbate or an analog thereof; (3) an iron source; (4) insulin or an insulin-like growth factor; (5) at least one chondroinductive agent or factor; and (6) glucose.

52. The process of Claim 51 wherein said mesenchymal stem cells are isolated, culture expanded human mesenchymal stem cells.

53. The process of Claim 51 wherein the mesenchymal stem cells are condensed into close proximity.

54. The process of Claim 53 wherein the mesenchymal stem cells are present as packed cells or a centrifugal cell pellet.

55. The process of Claim 51 wherein said at least one chondroinductive agent is selected from the group consisting of (i) a glucocorticoid; (ii) a member of the transforming growth factor- β super-family; (iii) a component of the collagenous extracellular matrix; and (iv) a vitamin A analog.